

## ANTELOPE CREEK/CLOVER VALLEY CREEK

### A. Water Quality Data

**1. 1959 Foot Survey from Roseville to Rocklin (Atlantic Street? To Sunset Blvd.):** On October 7, 1959 a foot survey was conducted from what the surveyor described as N. Main Street in Roseville to about 1 mile upstream of the Rocklin-Loomis Wastewater Treatment Plant. Checking an old topographic map and current maps, it appears that this survey covered the stream from about Atlantic Street in Roseville to Sunset Blvd. in Rocklin. The former Rocklin-Loomis Wastewater Treatment Plant was located about where Highway 65 now crosses over Antelope Creek. This survey reported the following results: **Source: California Department of Fish and Game, Region 2 files.**

**Table 1.** Water quality data from a one-time foot survey from Roseville to Rocklin on 10/7/1959. Note the high pH reading in the stream.

Station	Time	Water Temp	Dissolved Oxygen	pH	Flow (cfs)
N. Main St. [Atlantic Street?]	1330	60	10.2	--	4
½ Mile Upstream	1400	60	10.0	--	4
Rocklin-Loomis WWTP	1430	60	10.4	8.6	4
1 Mile Upstream [Sunset Blvd.]	1530	60	9.0	--	4

Source: California Department of Fish and Game, Region 2 files.

**2. 2001 and Periodic Water Quality Sampling:** Periodic water quality information has been collected for several sites in the Antelope Creek Watershed since December of 2000. During 2001, the Central Valley Regional Water Quality Control Board (Regional Board) staff conducted monthly monitoring near the Sierra College Blvd. crossing and Sunset Boulevard crossing in Rocklin. The Dry Creek Conservancy (DCC) has conducted periodic “first flush” monitoring at Sierra College Blvd., Atlantic Ave., and in Clover Valley Creek. A variety of parameters are collected, but the data set is not comprehensive or systematic for all parameters. The Regional Board collections also included pesticide scans with no problems noted. Metals data indicate that concentrations of copper in samples collected in November 2001 exceeded drinking water quality standards (Table 2) at a water hardness of 50 mg/l (Table 3). While no hardness measurements were taken at the time of sampling, contemporary measurements indicate that hardness must have been near 50-60 mg/l. Data on hardness in the stream over the course of the one-year of monthly monitoring ranged from 24-98 mg/l, which demonstrate that the water quality standards at a hardness of 50 mg/l are applicable. Antelope Creek and Clover Valley Creek also showed measurable concentrations of barium on 11/13/2001. While no standard exists for barium, it is an indicator of industrial pollution.

**Table 2.** California Toxics Rule water quality standards for selected metals, based on a hardness of 50 mg/l as CaCO<sub>3</sub>.

<b>Metal</b>	<b>Maximum Concentration (Acute) (mg/l)</b>	<b>Continuous Concentration (Chronic) (mg/l)</b>
Barium	No standard	No standard
Cadmium	0.002	0.0013
Copper	0.007	0.005
Zinc	0.067	0.066

Source: California Toxics Rule (water quality objectives)

**Table 3.** Metal concentration data from three locations in the Antelope Creek Watershed. This data shows that copper concentrations exceed the California Toxics Rules standards calculated for a hardness of 50 mg/l as CaCO<sub>3</sub>.

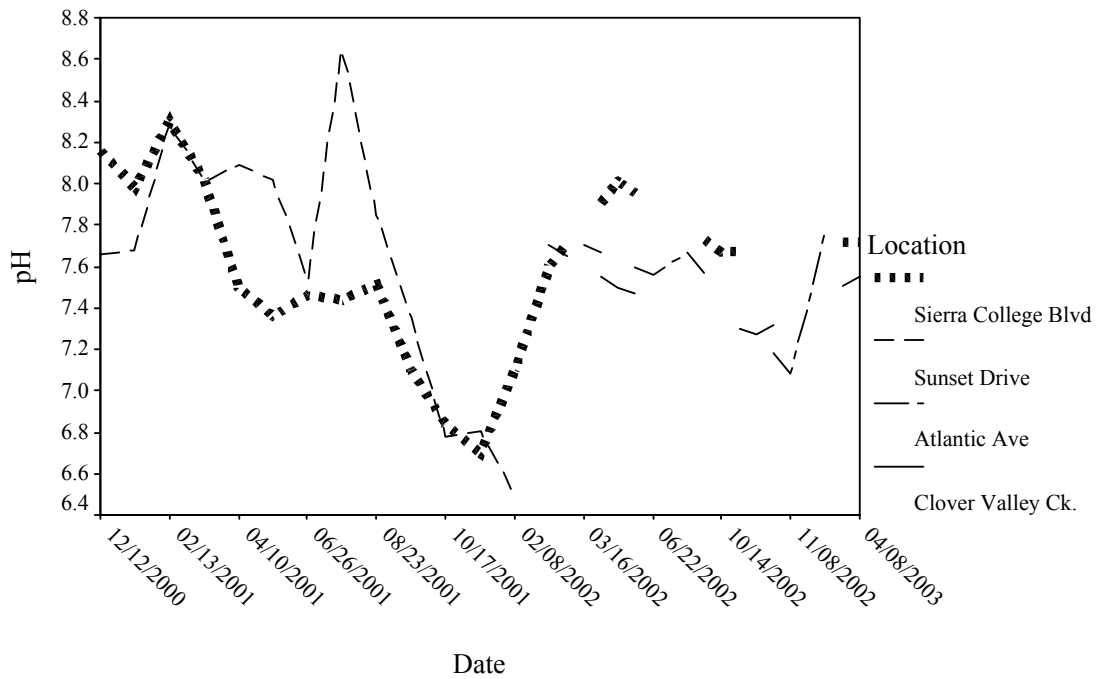
<b>Stream</b>	<b>Location</b>	<b>Date</b>	<b>Barium mg/l</b>	<b>Copper mg/l*</b>	<b>Zinc mg/l</b>	<b>Notes</b>
Antelope Creek	Sierra College Blvd.	11/13/01	0.055	<b>0.007</b>	0.018	Hardness ≈ 60 mg/l
Antelope Creek	Atlantic Ave.	11/13/01	0.059	<b>0.007</b>	0.015	Hardness ≈ 50 mg/l
Antelope Creek	Atlantic Ave.	11/08/02	ND	ND	0.039	
Antelope Creek	Clover Valley Ck. Tributary	11/13/01	0.056	ND	0.007	

\* Values in bold exceed California Toxics Rule objectives for aquatic life at a hardness of 50 mg/l. Sources: California Toxics Rule (water quality objectives); Central Valley Regional Water Quality Control Board; Dry Creek Conservancy, unpublished data.

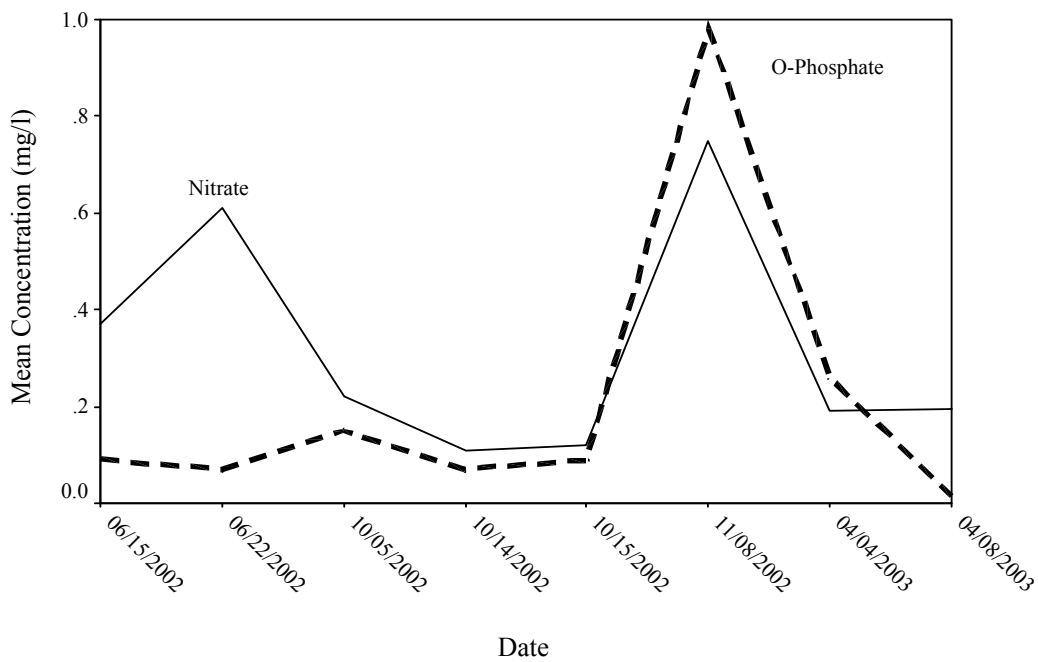
Selected water quality data of interest for aquatic systems is presented in Appendix Antelope Creek 1 of this chapter. These data were selected for inclusion here because of their overall importance in stream productivity and to identify any potential nutrient or water quality problems that may adversely affect aquatic species. A complete set of all water quality data is available electronically from the DCC, while Bailey Environmental has a complete copy of the provisional data. Figure 1 displays data from the four locations sampled within the watershed and shows unusual swings in pH values that were also observed in nearby streams. The cause of these fluctuations is unknown but of concern and should be evaluated further.

Appendix Antelope Creek 1 also contains limited data on concentrations of nitrate nitrogen (NO<sub>3</sub>) and orthophosphate (PO<sub>4</sub>). These data indicate that the biologically desirable ratio of nitrate to phosphate of 10:1 is not present in this stream. Figure 2 shows the mean values recorded in the various samplings; in general, the ratio of NO<sub>3</sub> to PO<sub>4</sub> is much lower than 10:1. Although the overall concentrations of these constituents can be low, there are concentrations recorded in which biostimulation could become a major concern, particularly in downstream areas. The data generally show that this stream has low values of hardness and alkalinity, which equates to lower levels of productivity. However, an increase in runoff and/or nutrient levels could begin to cause water quality problems.

**Figure 1.** Composite pH data from four sites in the Antelope Creek Watershed showing unusual annual variations in pH at individual locations.



**Figure 2.** Comparison of mean nitrate nitrogen and orthophosphate concentrations recorded in the Antelope Creek Watershed.



## **B. Water Temperature Data**

Water temperature data are limited, with some data from two-year monitoring at locations near Sierra College Blvd. and Sunset Blvd. (Figure 3) conducted by Central Valley Regional Water Quality Control Board staff. Additional information is spot data, usually taken quarterly during water quality sampling by members of the Dry Creek Conservancy. Most of the data come from hourly monitoring funded by Placer County and conducted by Bailey Environmental. This sampling was initiated in late May 2003 and will continue for approximately one year. All data retrieved to date are plotted in Figures 4-6 below. Since daily maximum, minimum, and/or mean temperatures individually are of little value, I have chosen to plot all data points. Therefore, I have split the year into time periods that roughly correspond to:

**Fall-early winter:** September through December; primary fall-run chinook spawning period is November-December.

**Winter-spring:** January through April; fall-run chinook incubation and rearing and steelhead spawning, incubation, and rearing.

**Late spring-summer:** May to September; summer rearing for steelhead juveniles.

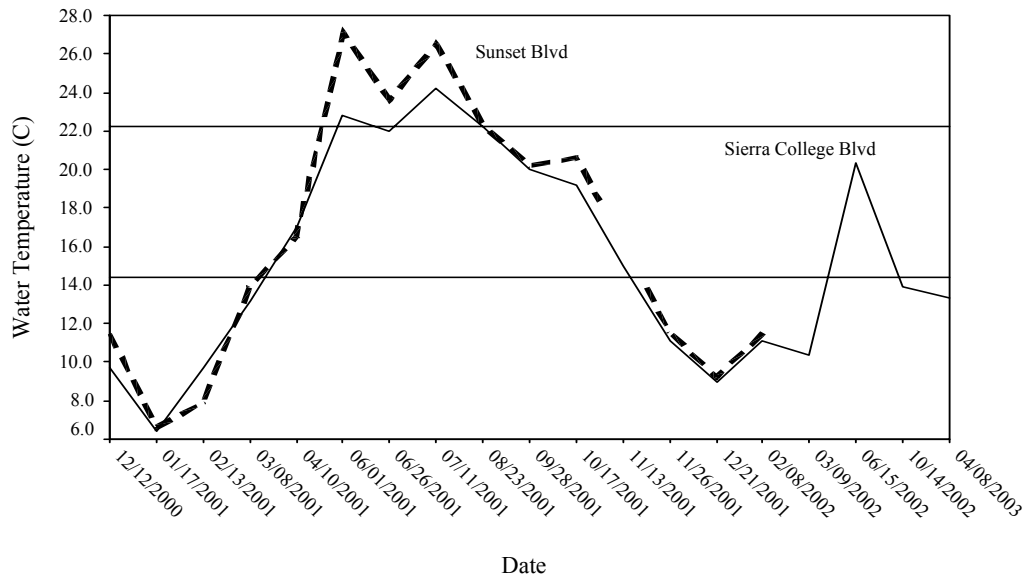
Data plots for these time periods are presented below to allow the reader to assess the potential of Antelope Creek to support chinook salmon and/or steelhead trout spawning and rearing. A variety of localized data and literature was reviewed in order to get some generalized understanding of the temperature effects on various life history stages for both chinook salmon and steelhead trout. There is fairly substantial variation in temperature effects noted for most life history stages. However, both chinook salmon and steelhead have a highly adaptable physiology and ability to seek thermal refuge during part of the day, which may allow them to tolerate and/or avoid lethal temperatures. Some of the literature sources cite criteria from others and some of the data is based on fish captures with water temperature taken concurrently. Two tables with data and reference are included in Appendix A of this report. Based on this review, the following criteria have been used to indicate what life history stages a particular stream may support at any given time:

<b><u>Chinook Salmon</u></b>	<b><u>°C</u></b>	<b><u>Steelhead Trout</u></b>	<b><u>°C</u></b>
Egg and fry development	14.4 (58 °F)	Egg and fry development	14.4 (58 °F)
Juvenile rearing	21.1 (70 °F)	Juvenile rearing	22.2 (72 °F)
Adult migration	21.7 (71 °F)	Adult migration and holding	22.2 (72 °F)

These reported temperature thresholds are plotted as reference lines, as appropriate, on figures 3-6 to roughly represent the water temperatures suitable for salmonid spawning migration, egg and fry development, and juvenile rearing.

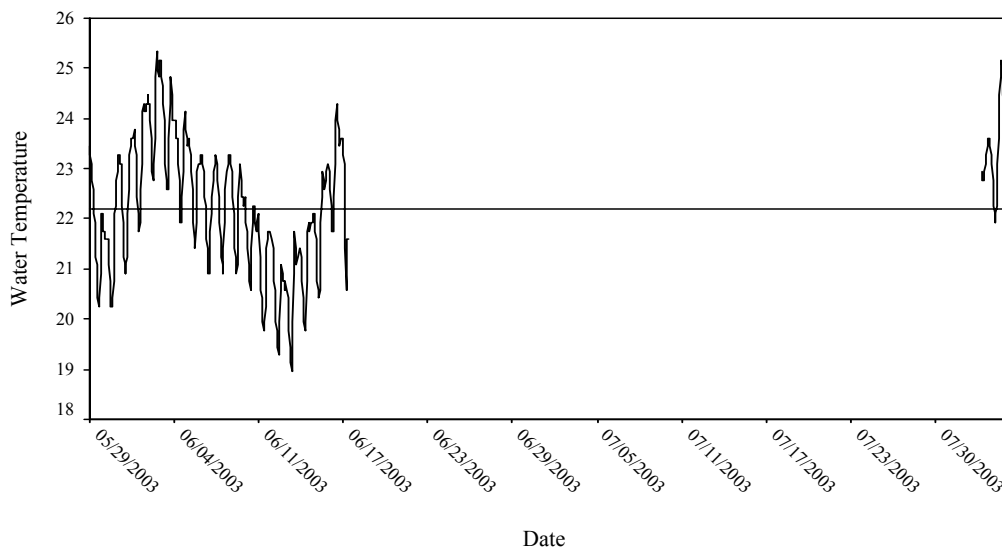
**1. December 2000 through 2001 And Subsequent Quarterly Sampling:** Figure 3 displays data collected primarily monthly at Sierra College Blvd and Sunset Blvd. and some subsequent data from quarterly water quality sampling. Some quarterly data is available for an Atlantic Ave. station and a station in Clover Valley Creek. **Source: Unpublished data from Dry Creek Conservancy and Regional Water Quality Control Board staff.**

**Figure 3.** Periodic water temperature data for Antelope Creek from stations located near Sierra College Blvd. and Sunset Blvd. in Rocklin. These data are spot samples and may not adequately represent the temperature conditions for anadromous fish. Thermal refugia may exist.

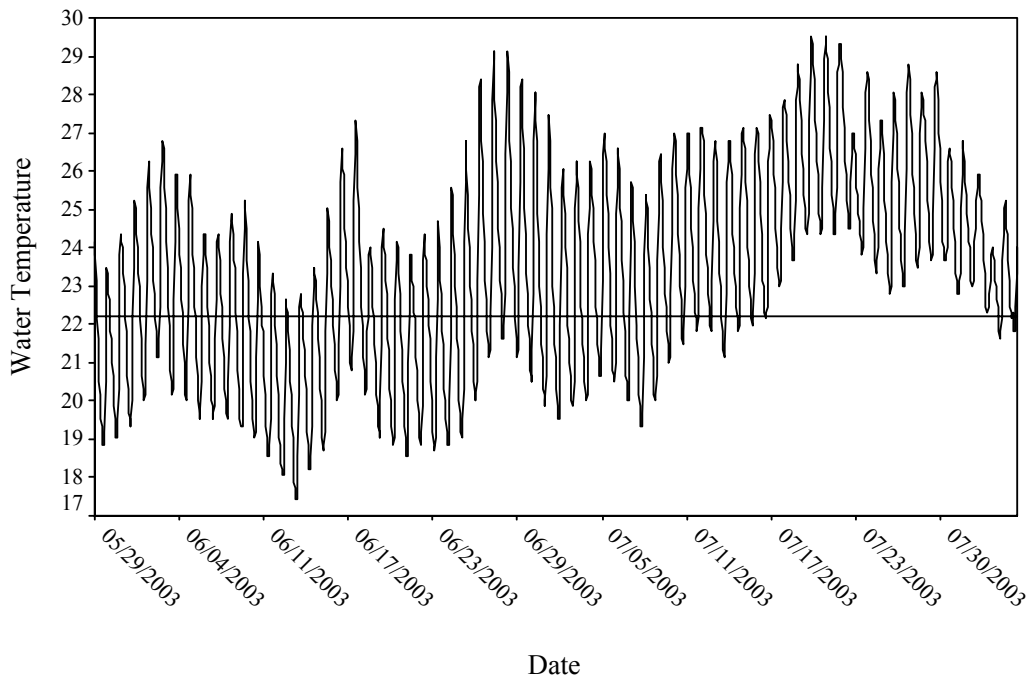


**2. Water Temperature Information from Bailey Environmental April 1999 to August 2003:** In May 2003, Placer County contracted to add additional stations on Antelope Creek. Stations were added at the Antelope Creek Drive crossing, 311 Sunset Blvd. in the City of Rocklin, and at the Myers residence near Midas Avenue. Figures 4-6 display all of the data to date.

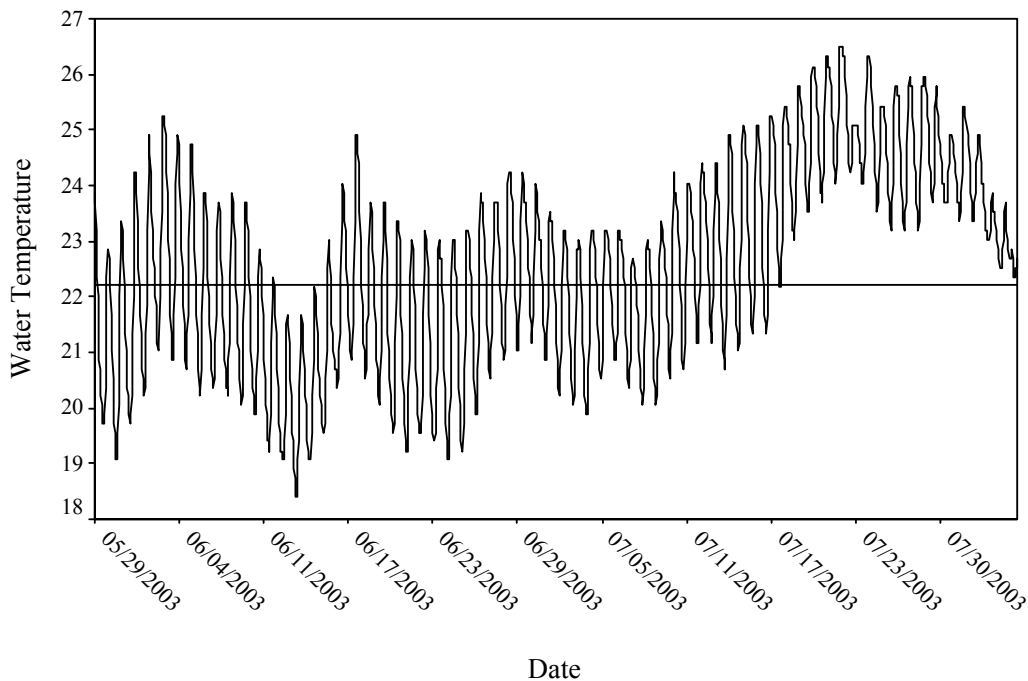
**Figure 4.** Water temperature time series for Antelope Creek at the Antelope Creek Drive crossing, during the period May 29 through August 4, 2003. Temperatures are marginal for juvenile rearing. Someone taking the sensor in and out of the stream is responsible for the missing data.



**Figure 5.** Water temperature time series for Antelope Creek at the 311 Sunset Blvd. station, during the period May 29 through August 4, 2003. Temperatures are marginal for juvenile rearing.



**Figure 6.** Water temperature time series for Antelope Creek at the Myers residence station, during the period May 29 through August 4, 2003. Temperatures are marginal to suitable for juvenile rearing.



### **C. Benthic Invertebrate Data**

Members of the Dry Creek Conservancy conduct the sampling program for benthic macroinvertebrates. Sampling data from 2000 at a single and unidentified site in Antelope Creek, two sampling sites in Antelope Creek (Atlantic Avenue and King Road) and two sites in Clover Valley Creek (Park, and Taglio) in 2001 are presented in Appendix Antelope Creek 2. These data indicate that Antelope Creek and particularly Clover Valley Creek have an extremely limited aquatic insect population. Also, the data indicate a high percentage of pollution tolerant organisms, with almost no taxa associated with cleaner waters. These results are not unexpected given the urban nature of the stream and the amount of sediment deposited in the channels of both streams. **Source: Dry Creek Conservancy, unpublished data.**

### **D. Physical Habitat Data**

Physical habitat data are limited to three sources for Antelope Creek's mainstem:

1. **1992-1993 Habitat Inventory by David Vanicek, Professor at California State University, Sacramento:** The habitat inventory was limited to two reaches in Antelope Creek. An explanation of the terminology used in the reach descriptions follows the actual descriptions. The first is described as a 700 m reach from the confluence with Dry Creek upstream to the Southern Pacific Railroad Crossing. The second reach started at the Railroad Crossing and covered approximately 875 m of channel. Vanicek describes the reaches as follows:

Reach 1: Mostly flatwater; a few 3<sup>rd</sup> class and one 1<sup>st</sup> class pools; appears to be recovering from disturbances caused by bridge and road construction; two possible spawning sites; overall quality: 2.

Reach 2: Mostly flatwater: a few pools, mostly 3<sup>rd</sup> class; very few riffles; mostly sand and silt substrate; some cover from overhanging banks; little canopy; several possible barriers at low flows; shallow riffles and debris dams; overall quality: 2.

Vanicek defines flatwater as the same as would be considered a glide in most other methodologies. A 1<sup>st</sup> class pool is large and deep with more than 30% of the stream bottom obscured, etc., or a maximum depth of > 1.5m. A 3<sup>rd</sup> class pool is described as small in area or shallow or both. Depth and velocity are sufficient to provide a low velocity holding area for a few adult salmon. **Source: Fisheries Habitat Evaluation Dry Creek, Antelope Creek, Secret Ravine, and Miners Ravine (Task I); Prepared for EIP Associates by C. David Vanicek, CSUS Hornet Foundation, August 1993, Copy from CDFG files, Region 2.**

2. **2002 Foot Survey by Randy Bailey, Bailey Environmental:** During November and December of 2002, I conducted foot surveys for chinook salmon from the bridge at Antelope Creek Drive downstream to the confluence with Dry Creek, a distance of approximately 1.8 miles. The purpose of the surveys was to supplement surveys being conducted by the Dry Creek Conservancy. I began at the bridge crossing on Antelope Creek Drive. Immediately upstream of the bridge was an impassible beaver dam that remained in place all winter long. I observed a

stream channel that is within the City of Roseville's Greenway area and is developing a substantial riparian vegetation community. Beavers are active in this reach of stream and there is ample evidence of their impacts. The stream bottom is covered with an excessive load of sediment that appears to be decomposed granite in origin. The channel does have a reasonably good meander pattern, with bank erosion occurring in some locations. The soil banks along the stream in this location are more dirt and clay, rather than granite. There is a substantial amount of large woody debris in the channel throughout its length. However, sources of recruitment of new large woody debris appear to be limited. Habitat complexity is good, but the amount of sediment in the channel limits aquatic insect production in riffle areas. This area is relatively low gradient. My conclusion is that this area is evolving into a good quality riparian area, which will stabilize the banks eventually. Occupation of the area by beavers may continue to create a problem for anadromous fish passage. Water temperatures during the summer period (data from the summer of 2003 only) indicate that this area is generally unsuitable for salmonid rearing. This situation could change with increased riparian community development and additional runoff from urban development. This area has a documented history of supporting chinook salmon spawning and rearing during the late fall and winter period.

**3. 2003 Placer County Stream Videography Project:** On March 12, 2003 Antelope Creek was videotaped from the air, from the confluence with Dry Creek upstream to King Road in Loomis. Review of the videotape shows a stream that has three segments that have different characteristics and anadromous fish production potential.

The first segment runs from the confluence with Dry Creek upstream to somewhere in the vicinity of Sunset Blvd. This segment has a relatively large channel, is protected by a formal greenway in downstream areas and a reasonable riparian zone in the upper portion of the segment. The downstream portion of this segment is dominated by excessive sediment loading, mostly decomposed granite, eroding banks, and long-term potential for a good riparian zone and vegetation. This segment has documented chinook salmon presence.

The second segment runs from about Sunset Blvd. upstream to about Midas Avenue. This segment has a much narrower riparian zone, the channel is much more incised, and there are numerous reaches where adjacent land uses are much more compatible than housing (e.g., golf course and community parks). The channel is much smaller than downstream and the major tributary is Clover Valley Creek. This segment and Clover Valley Creek have documented chinook salmon spawning and Clover Valley Creek has documented presence of "trout".

The third segment runs from about Midas Avenue upstream to the Sierra College/King Road area in Loomis. In this segment the stream narrows from about 8-10 ft wide in the downstream end of the segment to about 4-5 ft. wide at King Road. In the middle of this segment, near the railroad bridge crossing in Rocklin just downstream of Del Mar Avenue, there is a large wetlands complex and dam that changes the nature of the stream dramatically. In the area downstream of this wetlands complex, there may be some potential for anadromous fish production, but the size of the stream and the general character of the channel limit the potential. Members of the Myers family who reside about ¼ mile upstream of Midas Avenue indicate that they occasionally have seen a salmon in the backyard reach of the stream (Dana Myers, personal communication). Sediment in this area appears to be from soil and not the heavy layers of decomposed granite.

## **E. Fishery Resource Data**

### **1. Documented Fish Species Present in the Stream**

**California Department of Fish and Game, Region 2 files.** Region 2 files contain documentation of varying types that indicate that the following species have been found in Antelope Creek at various times:

Fall-run chinook salmon (native)	Brown bullhead
“trout”	Black bullhead
Golden shiner	“bass”
Green sunfish	Mosquitofish
Carp	Hitch
Speckled dace	Sacramento sucker
Sacramento pikeminnow (formerly known as Sacramento squawfish)	

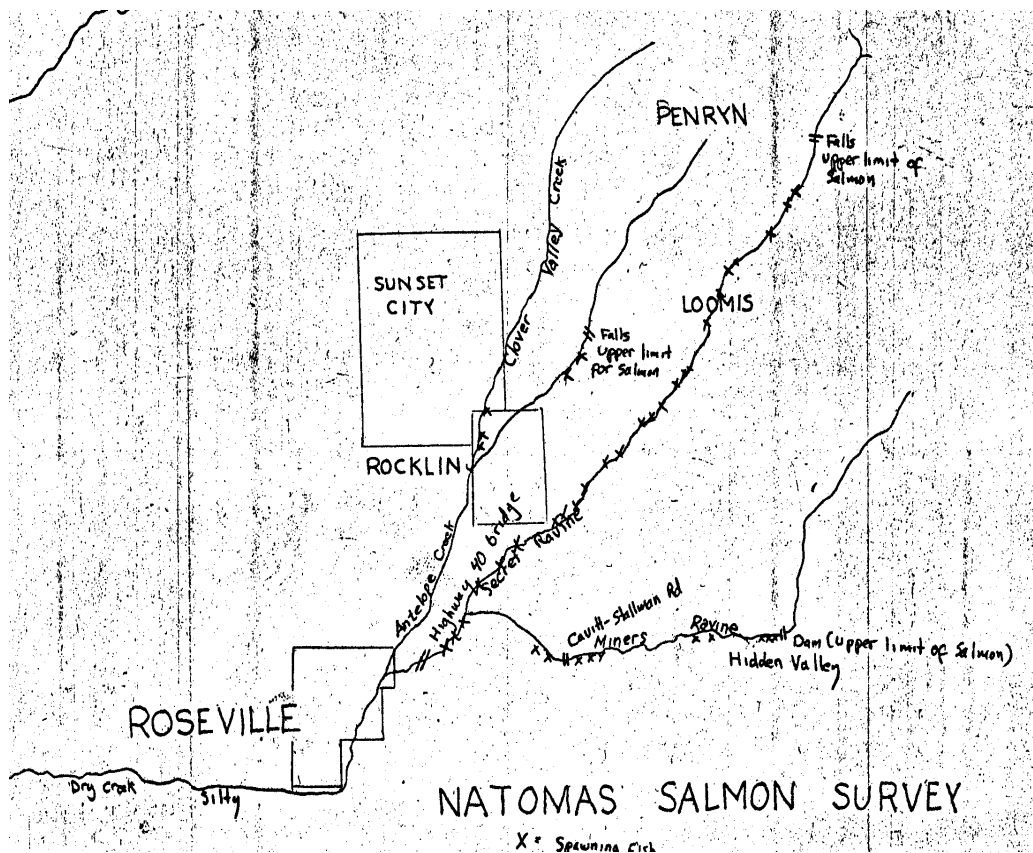
**2. Fish Stocking Records.** No records of fish stocking were found in Department of Fish and Game files.

### **3. Adult Spawning Timing, Distribution, and Population Estimates (Antelope and Clover Valley Creeks)**

- **April 3, 1964 Letter:** This letter, regarding construction activities within the Sunset City boundaries (Figure 7), concludes that fall-run chinook enter and spawn within the boundaries [of Sunset City] in both Antelope Creek and Clover Valley Creek. **Source: 4/3/64 Department of Fish and Game letter regarding construction in Sunset City; California Department of Fish and Game, Region 2 files.**
- **1963 Fall-Run Chinook Spawning Survey by Eric Gerstung:** This letter, discussing a proposed Clover Valley reservoir project, describes the results of the fall-run chinook salmon spawning survey conducted in 1963. The letter indicates that a survey was conducted on 12/3/63 from the Sunset City [Whitney Oaks?] Golf Course to the upper culvert [no location specified] (See also Figure 7 below). Although, this letter concludes that chinook use the lower ½ mile of stream (Clover Valley Creek), Gerstung concluded from redd counts that 10 pair of fish spawned in the fall of 1963. Fry from this year’s spawning were observed [presumably in the immediate area] on 4/12/1964. **Source: 10/19/64 Department of Fish and Game letter regarding a proposed Clover Valley reservoir project located about 1 mile upstream of the confluence with Antelope Creek; California Department of Fish and Game, Region 2 files.**
- **1964 Fall-Run Chinook Spawning Survey by Eric Gerstung:** Gerstung conducted a survey of 1,000 ft. of stream (noted in the records as “Clover Valley” and “Sunset” in the original memo) on 11/23/64. Based on Figure 7 and the section surveyed being described in the memorandum as “Sunset,” I have concluded that the survey actually occurred in

Clover Valley Creek. This conclusion conflicts with a 5/9/2002 CDFG letter (discussed below) but is consistent with a 10/19/64 CDFG letter regarding salmon surveys in 1963 (immediately above). Gerstung saw 1 carcass and 1 live fish. He estimated the run size to be 10 fish and indicated that the run size was similar to 1963, although no specific reference to any particular stream was noted. Water clarity was reported as clear and flow estimated at 5 cfs. **Source: May 25, 1965 memorandum in CDFG, Region 2 files.**

**Figure 7.** Location of 1964 salmon spawning surveys conducted by Eric Gerstung. This figure shows that he found fish spawning in Clover Valley Creek and Antelope Creek.

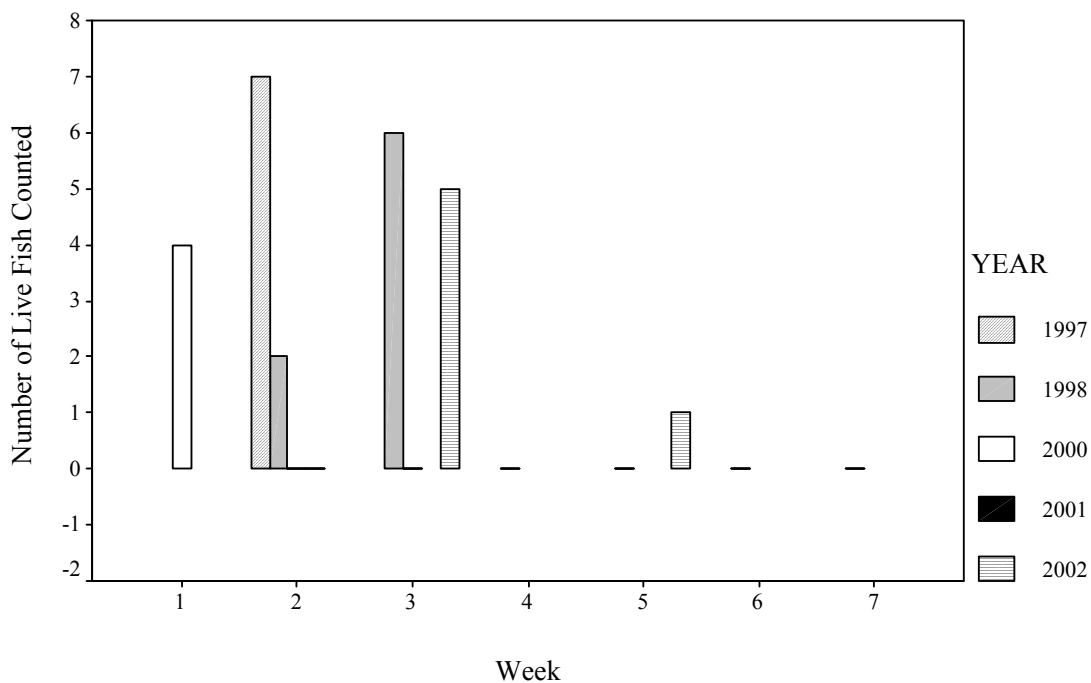


- **December 6, 1985 Spawning Survey:** Antelope Creek was surveyed for fall-run chinook salmon on 12/6/85. The stream was surveyed from the confluence with Dry Creek to approximately 1 mile upstream. No live fish were seen, but one skeleton was observed. Visibility was rated poor (6"), flow estimated at 10 cfs, and no gravel was noted. **Source: 12/19/85 Memorandum from CDFG Biologist Phil Hanson, CDFG, Region 2 files.**
- **5/9/2002 Letter Regarding the Proposed Clover Valley Development:** This letter discusses anadromous salmonids [fall-run chinook salmon?] and the proposed housing development in Clover Valley. This letter states that Department files show anadromous salmonids downstream of the proposed development. The letter also states that adult

chinook carcasses were found downstream of Sunset-Whitney Golf Course on 12/3/64. This conclusion is different from the actual survey data and conclusions reached in two contemporary letters signed by the Department in 1964. I conclude that this letter misinterpreted the data from the earlier sources and that fall-run chinook salmon have been documented spawning in the lower ½ mile of Clover Valley Creek. **Source: 5/9/2002 Letter in CDFG Region 2, files.**

- **Summary of Dry Creek Conservancy Fall-run Chinook Salmon Surveys in Antelope Creek:** Dry Creek Conservancy members have been conducting foot surveys during the fall and early winter since 1997. The reach surveyed is described as being from Atlantic Street in Roseville upstream to the culverts at the old dump, which is a distance of about 3,000 ft. Surveys usually begin about November 1<sup>st</sup> and continue until late December. Surveys are not systematic or comprehensive and do not include all known spawning areas. **Source: Dry Creek Conservancy; unpublished data.**

**Figure 8.** Summary of fall-run chinook sampling surveys, with number of live fish reported, from 1997 to 2002 in a 3,000 ft. section of Antelope Creek in Roseville.



#### 4. Juvenile Distribution and Sampling Data

- **10/19/1964 Letter:** This letter regarding a proposed reservoir project in Clover Valley documents two sets of observations regarding fish species composition in Clover Valley Creek. The first indicates that the stream has been perennial since 1909 when water releases from PG&E started and the local game warden reports “trout” in the upper portion of the stream.

The second observation documents results of an electrofishing survey conducted in two locations (lower section within Sunset City below a small diversion dam and an upper section above the Sunset City diversion) on 8/4/64. Catch at the lower section is reported as “small suckers” with flow estimated a 1.5 cfs. No distance electrofished is reported. At the upper section, catch is reported as: carp, suckers, mosquitofish, squawfish, and hitch. Flow was estimated as 4 cfs, water temperature 72 F, stream width 10 ft., and the stream bottom silty with patches of gravel. **Source: 10/19/64 Department of Fish and Game letter regarding a proposed Clover Valley reservoir project located about 1 mile upstream of the confluence with Antelope Creek; California Department of Fish and Game, Region 2 files.**

- **Spring 1965 Fall-Run Chinook Juvenile Emigration Survey by Eric Gerstung:** Gerstung began trapping for downstream migrant fall-run chinook juveniles in Antelope Creek (no location noted) on February 17, 1965 and continued through February 24<sup>th</sup> when the trap was moved to Auburn Ravine. Sampling was with a “riffle” trap or perforated plate trap. The trap fished a total of 166 ½ hours and captured no juvenile chinook salmon. Catch composition is noted as 2 crayfish, 1 carp, and 2 squawfish. Water temperatures were reported as ranging from 46-48 F during this week. **Source: May 25, 1965 memorandum in CDFG, Region 2 files; handwritten draft of May 25, 1965 memo, and other handwritten notes.**
- **March 1972 One-Time Electrofishing Event:** The Department of Fish and Game conducted a one-time electrofishing event on March 30, 1972 at a location described as a 100 yard section northeast of the railroad bridge [this could be one of two places, either in Roseville or in Rocklin downstream of Del Mar Avenue] in Antelope Creek. Based on the catch composition I conclude that this site is at the Roseville location. Catch composition is reported as: 5- golden shiners, 2- hitch, 9- squawfish, 2 – dace, 3- black bullhead, 1- brown bullhead, 2-yearling bass not captured but observed, and 4-green sunfish. Flow was reported as high. **Source: Unsigned, unidentifiable author note in CDFG, Region 2 files.**

## **F. Fish Passage or Screening Data**

### **1. Man Made Structures and Natural Barriers**

Two man-made structures are of concern. The first is the asphalt-bottomed culvert under Sunset Blvd. in Rocklin. This culvert is no doubt a barrier under low, and possibly moderate, flow conditions. The second is the dam immediately upstream of the railroad bridge in Rocklin. This dam creates a large wetlands complex and may or may not be a barrier to adult anadromous salmonids moving upstream. In Figure 7, Eric Gerstung notes a waterfall on Antelope Creek as being a barrier to upstream salmon migration. That assessment is nearly 40 years old and may no longer be valid. There are no records in CDFG files to indicate that the barrier has been removed and review of the recent videotapes did not reveal the presence of a falls, although it would have been possible to miss such a small feature. These two situations warrant further evaluation.

## **2. Water Flows**

Low flows in Antelope Creek or Clover Valley Creek could eliminate or impede adult anadromous fish passage during critical times of the year. However, since flow volumes are mainly determined by rainfall amounts and not importation or extraction of large volumes by water agencies or diverters, natural flows will continue to be the controlling factor. Also, it is possible that as the watershed continues to urbanize, less water will infiltrate into the groundwater, thus lowering the water table and/or reducing minimum summer and early fall flows. Increasing the area of impermeable surface will also result in increased and more rapidly rising peak runoff and instream flow followed by more rapid declines in flow following the peak. This quick peaking and decline in flows tends to alter the natural hydrodynamics of a stream channel and can lead to bank erosion and increased sediment transport and deposition in and to downstream areas. Given that natural flows are the dominate flow factor in this watershed, there are changes in channel geometry that can be made, using acceptable stream restoration techniques, that will result in pool scour, increasing water depth in the thalweg, and improved sediment transport. All of these habitat features are in short supply in this watershed

## **3. Beaver Dams**

Beaver dams in Antelope Creek are a continuing impediment to adult anadromous fish attempting to move into upstream areas to spawn. For example, a large impassable beaver dam remained in place for the entire winter of 2002-03 just upstream of the bridge at Antelope Creek Drive in Roseville (Bailey Environmental, unpublished data). Evidence of other dams downstream from this location were also present, but these dams did partially wash out during a high flow event. Beaver dam management must be considered an option in order to make upstream spawning and rearing areas available for anadromous fish in this watershed.

## **APPENDIX ANTELOPE CREEK 1**

### **SELECTED WATER QUALITY DATA FROM THE ANTELOPE CREEK WATERSHED**

LOCATION	DATE	NO3	PO4	PH	ALK	HARD
Near Sierra College Blvd	12/12/00	---	---	8.16	---	---
Near Sierra College Blvd	01/17/01	---	---	7.98	78.00	92.00
Near Sierra College Blvd	02/13/01	---	---	8.30	62.00	68.00
Near Sierra College Blvd	03/08/01	---	---	8.02	70.00	64.00
Near Sierra College Blvd	04/10/01	---	---	7.50	68.00	80.00
Near Sierra College Blvd	06/01/01	---	---	7.36	54.00	48.00
Near Sierra College Blvd	06/26/01	---	---	7.46	54.00	48.00
Near Sierra College Blvd	07/11/01	---	---	7.44	24.00	28.00
Near Sierra College Blvd	08/23/01	---	---	7.51	26.00	24.00
Near Sierra College Blvd	09/28/01	---	---	7.10	38.00	32.00
Near Sierra College Blvd	10/17/01	---	---	6.84	46.00	72.00
Near Sierra College Blvd	11/13/01	.43	---	---	---	---
Near Sierra College Blvd	11/26/01	---	---	6.70	70.00	56.00
Near Sierra College Blvd	12/21/01	---	---	---	---	---
Near Sierra College Blvd	02/08/02	---	---	7.10	---	---
Near Sierra College Blvd	03/09/02	---	---	7.60	---	---
Near Sierra College Blvd	06/15/02	.09	.37	8.01	---	---
Near Sierra College Blvd	10/14/02	.07	.11	7.67	---	---
Near Sierra College Blvd	04/08/03	.00	.25	7.72	---	---
Sunset Blvd.	12/12/00	---	---	7.66	---	---
Sunset Blvd.	01/17/01	---	---	7.68	70.00	92.00
Sunset Blvd.	02/13/01	---	---	8.29	62.00	68.00
Sunset Blvd.	03/08/01	---	---	8.01	72.00	68.00
Sunset Blvd.	04/10/01	---	---	8.09	70.00	68.00
Sunset Blvd.	06/01/01	---	---	8.02	56.00	56.00
Sunset Blvd.	06/26/01	---	---	7.53	56.00	56.00
Sunset Blvd.	07/11/01	---	---	8.65	44.00	68.00
Sunset Blvd.	08/23/01	---	---	7.85	36.00	36.00
Sunset Blvd.	09/28/01	---	---	7.35	36.00	24.00
Sunset Blvd.	10/17/01	---	---	6.78	56.00	60.00
Sunset Blvd.	11/26/01	---	---	6.80	68.00	64.00
Sunset Blvd.	12/21/01	---	---	---	---	---
Sunset Blvd.	02/08/02	---	---	6.50	---	---
Atlantic Ave.	11/13/01	.75	---	---	---	---
Atlantic Ave.	03/16/02	---	---	7.70	---	---
Atlantic Ave.	06/22/02	.07	.61	7.56	---	---
Atlantic Ave.	10/05/02	.15	.22	7.67	---	---
Atlantic Ave.	11/08/02	.98	.75	7.08	---	---
Atlantic Ave.	04/04/03	.26	.19	7.77	---	---
Clover Valley Ck.	11/13/01	---	---	---	---	---
Clover Valley Ck.	03/09/02	---	---	7.70	---	---
Clover Valley Ck.	06/15/02	---	---	7.50	---	---
Clover Valley Ck.	10/15/02	.09	.12	7.27	---	---
Clover Valley Ck.	04/08/03	.03	.14	7.55	---	---

## **APPENDIX ANTELOPE CREEK 2**

**BENTHIC MACROINVERTEBRATE DATA  
COLLECTED BY THE DRY CREEK CONSERVANCY**

Antelope Creek Benthic Macroinvertebrate Samples 2000													
				-						Antelope Creek			
							SAMPLING STATION:			2000			
				-			REPLICATE #	TV	FFG	51	52	53	Total
PHYLUM ARTHROPODA													
			Class Insecta										
			Coleoptera (Larvae)										
				Elmidae			4	c					
							<i>Dubiraphia sp.</i>	6	c				
							<i>Microcylloepus sp.</i>	4	c				
				Diptera									
				Ceratopogonidae			6	p					
							<i>Bezzia sp./ Palpomyia sp.</i>	6	p			1	1
							<i>Dasyhelea sp. (pupa)</i>	6	nf				
				Chironomidae			6						
				Chironominae									
				Chironomini			6	c					
				Pseudochironomini			5	c					
				Tanytarsini			6	c	12	8	8	28	
				Orthocladiinae			5	c	18	4	19	41	
				Tanypodinae			7	p					
				Empididae			6	p					
							<i>Clinocera sp.</i>	6	p				
							<i>Hemerodromia sp.</i>	6	p				
							<i>Neoplasta sp.</i>	6	p				
				Muscidae			6	p					
							<i>Limmophora sp.</i>	6	p				
				Simuliidae			6	f					
							<i>Simulium sp.</i>	6	f	12	49	16	77
				Tipulidae			3						
							<i>Limonia sp.</i>	6	s				
				Hemiptera									
				Corixidae			8	p					
							<i>Sigara sp.</i>	8	p				
				Megaloptera									
				Sialidae			4	p					
							<i>Sialis sp.</i>	4	p				
				Odonata									
				Calopterygidae			5	p					
							<i>Hetaerina sp.</i>	6	p				

				Coenagrionidae		p				
				<i>Argia sp.</i>	7	p	5	1	4	10
				Gomphidae	4	p				
				<i>Ophiogomphus occidentis.</i>	4	p	1			1
				Libellulidae	9	p				
				<i>Brechmorhoga mendax</i>	9	p	4		2	6
				Lepidoptera						
				Nepticulidae		s				
				Pyrilidae	5					
				<i>Petrophila sp.</i>	5	g	1		3	4
				Ephemeroptera						
				Baetidae	4	g				
				<i>Baetis sp.</i>	5	c	15	20	21	56
				<i>Camelobaetidius sp.</i>	4	c				
				<i>Fallceon quilleri</i>	4	c			2	2
				Caenidae	7	c				
				<i>Caenis sp.</i>	7	c			1	1
				Ephemerellidae	1	c				
				<i>Eurylophella lodi</i>	1	c				
				Leptohyphidae	4	c				
				<i>Tricorythodes minutus</i>	4	c	14	3	3	20
				Plecoptera						
				Chloroperlidae	1	p				
				Perlodidae	2	p				
				<i>Isoperla sp.</i>	2	p				
				Trichoptera						
				Glossosomatidae	0	g				
				<i>Protophila coloma</i>	1	g	6		1	7
				Helicopsychidae	3	g				
				<i>Helicopsyche borealis</i>	3	g				
				Hydropsychidae	4	f				
				<i>Hydropsyche californica</i>	4	f	54	123	103	280
				Hydroptilidae	4	g				
				<i>Hydroptila sp.</i>	6	g				
				<i>Leucotrichia pictipes</i>	6	g			5	5
				<i>Ochrotrichia sp.</i>	4	c				
				<i>Oxyethira sp.</i>	3	c				
				Lepidostomatidae	1	s				
				<i>Lepidostoma sp.</i>	1	s				
				Leptoceridae	4	c				
				<i>Mystacides alafimbriata</i>	4	c				
				<i>Nectopsyche gracilis</i>	3	c				

				-				Triaenodes/Ylodes sp.	6	s					
				-				Philopotamidae	3	f					
				-				Chimarra sp.	4	f					
				-				Wormaldia sp.	3	f					
				-											
Subphylum Chelicerata															
Class Arachnoidea															
				-	Acari										
				-				Hygrobatidae	8	p					
				-				Hygrobates sp.	8	p					
				-				Megapella sp.	8	p					
				-				Lebertiidae	8	p					
				-				Lebertia sp.	8	p			1		1
				-				Sperchontidae	8	p					
				-				Sperchon sp.	8	p	9	2	9		20
				-				Torrenticolidae	5	p					
				-				Torrenicola sp.	5	p					
				-											
Subphylum Crustacea															
Class Malacostraca															
				-	Amphipoda										
				-				Cragonyctidae	4	c					
				-				Crangonix sp.	4	c			2		2
				-				Stygobromus sp.	4	c					
				-				Hyaellidae	8	c					
				-				Hyaella sp.	8	c					
				-	Decapoda										
				-				Astacidae	8	c					
				-				Pacificasticus lenisculus	6	c			1		1
Class Ostracoda															
				-	Ostracoda				8	c					
				-				Cyprididae	8	c			2		2
				-											
PHYLUM COELENTERATA															
Class Hydrozoa															
				-	Hydroida										
				-				Hyridae							
				-				Hydra sp.	5	p					
				-											
PHYLUM MOLLUSCA															
Class Gastropoda															
				-	Pulmonata										
				-				Ancylidae	6	g					
				-				Ferrissia sp.	6	g	2	2	5		9
				-				Lymnaeidae	6	g					
				-				Fossaria sp.	8	g					



								Shannon Diversity			2.3	1.8	2.4	2.3
								Tolerance Value			5.4	5.0	5.4	5.3
								Percent Intolerant (0-2)			1.8	0.0	0.3	0.8
								Percent Tolerant (8-10)			21.4	8.0	17.2	16.0
								Percent Collectors			27.3	19.3	34.0	27.0
								Percent Filterers			28.2	66.2	45.0	45.1
								Percent Grazers			2.6	0.7	5.5	3.0
								Percent Predators			41.9	13.8	15.5	24.9
								Percent Shredders			0.0	0.0	0.0	0.0
								Total Percentages			100.0	100.0	100.0	100.0
								Total Abundance			1169	1100	1164	

Antelope Creek Benthic Macroinvertebrate CSBP Summary Metrics, 2000			
	Antelope Creek		
	2000		
	Mean	CV	Total
Taxa Richness	19.3	35.2	28.0
Percent Dominant Taxon	35.9	23.9	30.9
EPT Taxa	4.7	44.6	7.0
EPT Index (%)	42.0	33.6	40.9
Sensitive EPT Index	0.7	133.0	0.8
Ephemeroptera Taxa	2.7	43.3	4.0
Plecoptera Taxa	0.0	#DIV/0!	0.0
Trichoptera Taxa	2.0	50.0	3.0
Dipteran Taxa	3.3	17.3	4.0
Percent Dipteran	16.5	30.7	16.2
Non-Insect Taxa	8.7	43.7	13.0
Percent Non-Insect	39.3	44.3	40.6
Percent Chironomidae	7.5	36.2	7.6
Percent Hydropsychidae	32.0	46.1	30.9
Percent Baetidae	6.5	28.6	6.4
Shannon Diversity	2.2	13.8	2.3
Tolerance Value	5.2	4.3	5.3
Percent Intolerant (0-2)	0.7	133.0	0.8
Percent Tolerant (8-10)	15.5	44.1	16.0
Percent Collectors	26.9	27.5	27.0

Percent Filterers	46.5	41.0	45.1
Percent Grazers	3.0	81.3	3.0
Percent Predators	23.7	66.5	24.9
Percent Shredders	0.0	#DIV/0!	0.0

Antelope Creek Benthic Macroinvertebrate Samples 2001																				
												Antelope Creek @ Atlantic				Antelope Creek @ King Rd.				
									SAMPLING STATION:				2001				2001			
									REPLICATE #		TV	FFG	79	80	81	Total	85	86	87	Total
PHYLUM ARTHROPODA																				
			Class Insecta																	
			Coleoptera (Larvae)																	
				Elmidae				4	c											
							<i>Dubiraphia sp.</i>		6	c										
							<i>Microcylloepus sp.</i>		4	c										
			Diptera																	
				Ceratopogonidae						6	p									
							<i>Bezzia sp./ Palpomyia sp.</i>		6	p										
							<i>Dasyhelea sp. (pupa)</i>		6	nf										
				Chironomidae						6										
				Chironominae																
							Chironomini		6	c										
							Pseudochironomini		5	c										
							Tanytarsini		6	c	93	63	85	241	11	2			13	
							Orthocladiinae		5	c	8	6	10	24	12	2	8	22		
							Tanypodinae		7	p										
				Empididae						6	p									
							<i>Clinocera sp.</i>		6	p										
							<i>Hemerodromia sp.</i>		6	p		2		2						
							<i>Neoplasta sp.</i>		6	p										
				Muscidae						6	p									
							<i>Limnophora sp.</i>		6	p										
				Simuliidae						6	f									
							<i>Simulium sp.</i>		6	f	18	24	11	53	9	27	117	153		
				Tipulidae						3										
							<i>Limonia sp.</i>		6	s										
			Hemiptera																	
				Corixidae				8	p											
							<i>Sigara sp.</i>		8	p										
			Megaloptera																	

					Sialidae		4	p											
						<i>Sialis sp.</i>	4	p											
					Odonata														
					Calopterygidae		5	p											
						<i>Hetaerina sp.</i>	6	p											
					Coenagrionidae			p											
						<i>Argia sp.</i>	7	p	7	3	5	15	2			6		8	
					Gomphidae		4	p											
						<i>Ophiogomphus occidentis.</i>	4	p					1					1	
					Libellulidae		9	p											
						<i>Brechmorhoga mendax</i>	9	p	1	1	1	3				1		1	
					Lepidoptera														
					Nepticulidae			s				2						2	
					Pyrilidae		5												
						<i>Petrophila sp.</i>	5	g	6	13	6	25							
					Ephemeroptera														
					Baetidae		4	g											
						<i>Baetis sp.</i>	5	c	31	25	36	92			2			2	
						<i>Camelobaetidius sp.</i>	4	c											
						<i>Fallceon quilleri</i>	4	c			1	1							
					Caenidae		7	c											
						<i>Caenis sp.</i>	7	c	1			1	3					3	
					Ephemerellidae		1	c											
						<i>Eurylophella lodi</i>	1	c				2						2	
					Leptohyphidae		4	c											
						<i>Tricorythodes minutus</i>	4	c	4	6	12	22	14			4		18	
					Plecoptera														
					Chloroperlidae		1	p											
					Perlodidae		2	p											
						<i>Isoperla sp.</i>	2	p											
					Trichoptera														
					Glossosomatidae		0	g											
						<i>Protoptila coloma</i>	1	g		1		1							
					Helicopsychidae		3	g											
						<i>Helicopsyche borealis</i>	3	g											
					Hydropsychidae		4	f											
						<i>Hydropsyche californica</i>	4	f	44	42	49	135	23	1		1		25	
					Hydroptilidae		4	g											
						<i>Hydroptila sp.</i>	6	g	1		1	2							
						<i>Leucotrichia pictipes</i>	6	g	7	12	5	24							
						<i>Ochrotrichia sp.</i>	4	c											

[illegible]

		Class Gastropoda													
				Pulmonata											
					Ancylidae	6	g								
					<i>Ferrissia sp.</i>	6	g		1		1	1	1		2
					Lymnaeidae	6	g								
					<i>Fossaria sp.</i>	8	g					1			1
					Physidae	8	g								
					<i>Physa sp./ Physella sp.</i>	8	g				5				5
					Planorbidae	6	g								
					<i>Gyraulus sp.</i>	8	g								
					<i>Helisoma sp.</i>	6	g	1			1				
					<i>Micromenetus sp.</i>	6	g								
		Class Bivalvia													
					Pelecypoda	8	f								
					Corbiculidae	10	f								
					<i>Corbicula fluminea</i>	10	f	6	6	4	16	22	55	29	106
					Sphaeriidae	8	f								
					<i>Pisidium sp.</i>	8	f								
PHYLUM NEMATODA						5	p	4	2	3	9	5	8	18	31
PHYLUM PLATYHELMINTHES															
		Class Turbellaria													
					Tricladida										
					Planariidae	4	p								
					<i>Dugesia tigrina</i>	4	p	35	35	24	94	8	1	2	11
PHYLUM ANNELIDA															
		Class Oligochaeta				5	c	37	18	28	83	9	30	50	89
					Megadrili	5	c								
PHYLUM NEMERTEA															
		Class Enopla													
					Tertastemmatidae										
					<i>Prostoma graecense</i>	8	p	18	19	27	64	37	14	59	110
					Total			328	284	311	923	322	148	301	771
					Taxa Richness			20	19	18	24	21	15	14	26
					Percent Dominant Taxon			28	22	27	26	47	37	39	20
					EPT Taxa			7	5	6	9	5	2	2	6
					EPT Index (%)			27.1	30.3	33.4	30.2	14.3	2.0	1.7	7.0
					Sensitive EPT Index			0.3	0.4	0.0	0.2	0.6	0.0	0.0	0.3
					Ephemeroptera Taxa			3.0	2.0	3.0	4.0	3.0	1.0	1.0	4.0
					Plecoptera Taxa			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
					Trichoptera Taxa			4.0	3.0	3.0	5.0	2.0	1.0	1.0	2.0
					Dipteran Taxa			3.0	4.0	3.0	4.0	3.0	3.0	2.0	3.0
					Percent Dipteran			36.3	33.5	34.1	34.7	9.9	20.9	41.5	24.4

								Non-Insect Taxa			7.0	7.0	6.0	8.0	11.0	9.0	8.0	13.0
								Percent Non-Insect			32.3	30.3	28.6	30.4	74.5	76.4	54.5	67.1
								Percent Chironomidae			30.8	24.3	30.5	28.7	7.1	2.7	2.7	4.5
								Percent Hydropsychidae			13.4	14.8	15.8	14.6	7.1	0.7	0.3	3.2
								Percent Baetidae			9.5	8.8	11.9	10.1	0.0	1.4	0.0	0.3
								Shannon Diversity			2.3	2.4	2.3	2.4	2.0	1.8	1.8	2.3
								Tolerance Value			5.5	5.4	5.5	5.5	5.2	7.4	6.5	6.1
								Percent Intolerant (0-2)			0.0	0.4	0.0	0.1	0.6	0.0	0.0	0.3
								Percent Tolerant (8-10)			9.1	10.9	11.3	10.4	20.5	48.6	30.6	29.8
								Percent Collectors			53.4	41.5	55.3	50.4	64.3	25.0	21.9	40.2
								Percent Filterers			20.7	25.4	20.6	22.1	16.8	56.1	48.8	36.8
								Percent Grazers			4.6	9.5	3.9	5.9	1.9	1.4	0.0	1.0
								Percent Predators			21.3	23.6	20.3	21.7	16.5	17.6	29.2	21.7
								Percent Shredders			0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.3
								Total Percentages			100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
								Total Abundance			2624	1704	2496		322	148	301	

Antelope Creek Benthic Macroinvertebrate CSBP Summary Metrics, 2001						
	Antelope Creek @ Atlantic			Antelope Creek @ King Rd.		
	2001			2001		
	Mean	CV	Total	Mean	CV	Total
Taxa Richness	19.0	5.3	24.0	16.7	22.7	26.0
Percent Dominant Taxon	26.0	12.7	26.1	40.9	12.3	20.0
EPT Taxa	6.0	16.7	9.0	3.0	57.7	6.0
EPT Index (%)	30.3	10.4	30.2	6.0	119.9	7.0
Sensitive EPT Index	0.2	87.3	0.2	0.2	173.2	0.3
Ephemeroptera Taxa	2.7	21.7	4.0	1.7	69.3	4.0
Plecoptera Taxa	0.0	#DIV/0!	0.0	0.0	#DIV/0!	0.0
Trichoptera Taxa	3.3	17.3	5.0	1.3	43.3	2.0
Dipteran Taxa	3.3	17.3	4.0	2.7	21.7	3.0
Percent Dipteran	34.6	4.3	34.7	24.1	66.4	24.4
Non-Insect Taxa	6.7	8.7	8.0	9.3	16.4	13.0
Percent Non-Insect	30.4	6.1	30.4	68.5	17.7	67.1
Percent Chironomidae	28.5	12.9	28.7	4.2	61.8	4.5
Percent Hydropsychidae	14.7	8.0	14.6	2.7	141.2	3.2
Percent Baetidae	10.1	16.2	10.1	0.5	173.2	0.3
Shannon Diversity	2.3	3.0	2.4	1.9	7.4	2.3
Tolerance Value	5.5	0.2	5.5	6.4	17.4	6.1
Percent Intolerant (0-2)	0.1	173.2	0.1	0.2	173.2	0.3
Percent Tolerant (8-10)	10.4	10.8	10.4	33.2	42.9	29.8

Percent Collectors	50.1	14.9	50.4	37.1	63.7	40.2
Percent Filterers	22.2	12.2	22.1	40.6	51.6	36.8
Percent Grazers	6.0	51.4	5.9	1.1	89.8	1.0
Percent Predators	21.7	7.8	21.7	21.1	33.6	21.7
Percent Shredders	0.0	#DIV/0!	0.0	0.2	173.2	0.3

Clover Valley Creek Benthic Macroinvertebrate Samples 2001																					
										Clover Valley Crk @ Park				Clover Valley Creek At Taglio							
										2001				2001							
										REPLICATE #	TV	FFG	76	77	78	Total	82	83	84	Total	
PHYLUM ARTHROPODA																					
		Class Insecta																			
		Coleoptera (Larvae)																			
					Elmidae					4	c										
										6	c										

			Gomphidae	4	p								
			<i>Ophiogomphus occidentis.</i>	4	p				1	1			2
			Libellulidae	9	p								
			<i>Brechmorhoga mendax</i>	9	p								
			Lepidoptera										
			Nepticulidae		s								
			Pyrilidae	5									
			<i>Petrophila sp.</i>	5	g								
			Ephemeroptera										
			Baetidae	4	g								
			<i>Baetis sp.</i>	5	c	7		7		1	8		9
			<i>Camelobaetidius sp.</i>	4	c								
			<i>Fallceon quilleri</i>	4	c								
			Caenidae	7	c								
			<i>Caenis sp.</i>	7	c	7	14		21				
			Ephemerellidae	1	c								
			<i>Eurylophella lodi</i>	1	c			1	1				
			Leptohiphidae	4	c								
			<i>Tricorythodes minutus</i>	4	c					3	1	3	7
			Plecoptera										
			Chloroperlidae	1	p								
			Perlodidae	2	p								
			<i>Isoperla sp.</i>	2	p								
			Trichoptera										
			Glossosomatidae	0	g								
			<i>Protophila coloma</i>	1	g								
			Helicopsychidae	3	g								
			<i>Helicopsyche borealis</i>	3	g								
			Hydropsychidae	4	f								
			<i>Hydropsyche californica</i>	4	f	11	15	5	31	52	8	22	82
			Hydroptilidae	4	g								
			<i>Hydroptila sp.</i>	6	g								
			<i>Leucotrichia pictipes</i>	6	g								
			<i>Ochrotrichia sp.</i>	4	c								
			<i>Oxyethira sp.</i>	3	c			1	1				
			Lepidostomatidae	1	s								
			<i>Lepidostoma sp.</i>	1	s						2		2
			Leptoceridae	4	c								
			<i>Mystacides alafimbriata</i>	4	c								
			<i>Nectopsyche gracilis</i>	3	c								
			<i>Triaenodes/Ylodes sp.</i>	6	s							2	2

[illegible]

			-												
				Planorbidae											
			-												
				<i>Gyraulus sp.</i>											
			-												
				<i>Helisoma sp.</i>											
			-												
				<i>Micromenetus sp.</i>											
			-												
				Class Bivalvia											
			-	Pelecypoda											
			-	Corbiculidae											
			-					<i>Corbicula fluminea</i>							
			-	Sphaeriidae											
			-					<i>Pisidium sp.</i>							
PHYLUM NEMATODA															
			-												
PHYLUM PLATYHELMINTHES															
				Class Turbellaria											
			-	Tricladida											
			-	Planariidae											
			-					<i>Dugesia tigrina</i>							
PHYLUM ANNELIDA															
			-	Class Oligochaeta											
			-	Megadrili											
PHYLUM NEMERTEA															
				Class Enopla											
			-	Tertastemmatidae											
			-					<i>Prostoma graecense</i>							
			-	Total											
				Taxa Richness											
				Percent Dominant Taxon											
				EPT Taxa											
				EPT Index (%)											
				Sensitive EPT Index											
				Ephemeroptera Taxa											
				Plecoptera Taxa											
				Trichoptera Taxa											
				Dipteran Taxa											
				Percent Dipteran											
				Non-Insect Taxa											
				Percent Non-Insect											
				Percent Chironomidae											
				Percent Hydropsychidae											
				Percent Baetidae											
				Shannon Diversity											

								Tolerance Value			5.5	7.0	6.5	6.3	5.8	5.6	5.1	5.4
								Percent Intolerant (0-2)			0.0	0.0	0.5	0.1	0.0	1.4	0.0	0.3
								Percent Tolerant (8-10)			8.3	42.4	30.5	27.7	26.7	28.7	4.0	16.0
								Percent Collectors			60.5	42.4	54.5	51.8	30.3	54.5	70.0	55.5
								Percent Filterers			7.9	30.2	26.3	21.7	46.7	16.8	12.8	23.0
								Percent Grazers			12.6	7.1	9.4	9.6	0.6	14.0	0.3	3.6
								Percent Predators			19.0	20.3	9.9	17.0	22.4	13.3	15.8	17.0
								Percent Shredders			0.0	0.0	0.0	0.0	0.0	1.4	0.7	0.7
								Total Percentages			100.0	100.0	100.0	100.0	100.0	100.0	99.7	99.8
								Total Abundance			253	295	213		165	143	297	

### Clover Valley Creek Benthic Macroinvertebrate CSBP Summary Metrics, 2001

	Clover Valley Crk @ Park			Clover Valley Creek At Taglio		
	2001			2001		
	Mean	CV	Total	Mean	CV	Total
Taxa Richness	15.7	20.5	23.0	20.0	21.8	30.0
Percent Dominant Taxon	29.5	19.8	25.2	32.0	23.9	23.6
EPT Taxa	2.7	21.7	5.0	3.3	34.6	5.0
EPT Index (%)	7.7	49.5	8.0	17.8	75.8	16.9
Sensitive EPT Index	0.3	173.2	0.3	0.5	173.2	0.3
Ephemeroptera Taxa	1.3	43.3	3.0	1.7	34.6	2.0
Plecoptera Taxa	0.0	#DIV/0!	0.0	0.0	#DIV/0!	0.0
Trichoptera Taxa	1.3	43.3	2.0	1.7	34.6	3.0
Dipteran Taxa	3.7	15.7	4.0	4.7	44.6	7.0
Percent Dipteran	24.7	15.8	24.8	13.6	100.7	17.4
Non-Insect Taxa	8.3	25.0	12.0	9.3	24.7	14.0
Percent Non-Insect	67.1	11.3	66.6	65.0	25.4	61.8
Percent Chironomidae	22.2	20.0	22.5	10.8	107.9	14.0
Percent Hydropsychidae	3.9	36.1	4.1	14.8	97.5	13.6
Percent Baetidae	0.9	173.2	0.9	1.1	123.6	1.5
Shannon Diversity	2.1	4.0	2.2	2.2	3.8	2.6
Tolerance Value	6.3	11.8	6.3	5.5	6.1	5.4
Percent Intolerant (0-2)	0.2	173.2	0.1	0.5	173.2	0.3
Percent Tolerant (8-10)	27.1	63.9	27.7	19.8	69.1	16.0
Percent Collectors	52.4	17.6	51.8	51.6	38.8	55.5
Percent Filterers	21.5	55.4	21.7	25.4	72.8	23.0
Percent Grazers	9.7	28.6	9.6	5.0	156.8	3.6
Percent Predators	16.4	34.8	17.0	17.2	27.5	17.0
Percent Shredders	0.0	#DIV/0!	0.0	0.7	101.3	0.7